

CLAIMS

What is claimed is:

1. An apparatus to position a flexible strand in a tunnel, having a diameter, formed in a bone while performing a surgery, the apparatus comprising:

a guide member extending along a first axis and having a first end and second end;

a guide portion defining an area, extending from said first end and along said first axis, said guide portion including,

a first leg and a second leg, said first leg and said second leg defining a slot disposed therebetween, wherein said slot defines a first plane;

said first leg further defining a first groove and said second leg defining a second groove; wherein said first groove extends along a distal end of said first leg and along an axial length of said first leg and said second groove extends along a distal end of said second leg and along an axial length of said second leg, said first groove and said second groove adapted to receive the flexible strand, wherein said first groove and said second groove define a second plane; and

wherein said first plane and said second plane intersect within the area defined by said guide portion.

2. The apparatus of claim 1, further comprising:

a guide system comprising a first member and a second member positioned at approximately a right angle, wherein a first bore is formed at a terminal end of said first member and a second bore is formed at a terminal end of said second member;

said second end of said member adapted to be received in said first bore; and

wherein said slot and said second bore are generally aligned.

3. The apparatus of claim 2, further comprising a tunnel forming device adapted to be received through said second bore and said slot, wherein a tunnel formed by said tunnel forming device is generally aligned with said slot and said bore.

4. The apparatus of claim 3, wherein said second end includes an alignment system comprising:

a projection extending laterally from said second end; and

a collar extending cylindrically from said member and disposed between said first end and said projection.

5. The apparatus of claim 4, wherein said second bore includes a detent adapted to receive said projection in a keyed manner.

6. The apparatus of claim 1, wherein said slot has a depth greater than said groove into said guide portion.

7. The apparatus of claim 1, wherein said groove has internal dimensions substantially equivalent to said flexible strand and said groove is formed into said guide portion and extends over said slot.

8. The apparatus of claim 1, wherein said guide portion has a width substantially equal to the diameter of the tunnel in the bone.

9. The apparatus of claim 1, wherein the flexible strand is held over said slot when the flexible strand is held in said first groove and said second groove.

10. The apparatus of claim 8, wherein the internal dimensions of said first groove and said second groove are substantially equal to the dimensions of the flexible strand.

11. The apparatus of claim 1, wherein said first plane and said second plane are generally orthogonal.

12. The apparatus of claim 1, further comprising a guide system comprising a first member and a second member positioned at approximately a right angle, wherein a passage is formed at a terminal end of said first member and said second end of said guide member extends from a terminal end of said second member, and wherein said slot and said second bore are generally aligned.

13. The apparatus of claim 12, further comprising a tunnel forming device adapted to be received through said passage and said slot, wherein a tunnel formed by said tunnel forming device is generally aligned with said slot and said passage.

14. An apparatus to place a flexible strand in a tunnel, having a diameter, formed in bone while performing a surgery, the apparatus comprising:

a first member having a first end and a second end spaced apart, said first end defining a slot, adapted to guide an instrument, wherein said slot lies in a first plane, said first end further defining a groove, wherein said groove lies in a second plane, wherein said first plane and said second plane intersect; and

a second member having a first end and a second end, said second member defining a guide section positioned adjacent said first end and said first member extends adjacent to said second end of said second member; wherein said first end of said first member and said guide section are generally aligned.

15. The apparatus of claim 14, wherein said second end of said second member defines a bore comprising a detent.

16. The apparatus of claim 15, wherein said member further comprises an alignment system comprising:

a projection extending laterally from said second end keyed to said detent; and

a collar extending cylindrically from said member and disposed between said first end and said projection.

17. The apparatus of claim 14, further comprising a flexible strand positionable in and between said first groove and said second groove, wherein said flexible strand is slideable in said groove.

18. The apparatus of claim 14, further comprising a tunnel forming device adapted to be received through said guide section and said slot, wherein a tunnel formed by said tunnel forming device is generally aligned with said slot and said guide section.

19. The apparatus of claim 14, wherein said slot has a depth greater than said groove into said member.

21. The apparatus of claim 14, wherein said first end of said member has a width substantially equal to the diameter of the tunnel in the bone.

23. The apparatus of claim 14, wherein said guide section is a bore at said first end.

24. A kit of surgical devices for performing surgery in a tunnel, having a diameter, formed in a bone, the kit comprising:

a guide system comprising:

a first member comprising a first leg and a second leg, a terminal end of said first leg defining a guide section having a first axis;

at least one guide member extending along a second axis having a first end and a second end, wherein said first end extends from a terminal end of said second leg, and wherein said first axis and said second axis are generally orthogonal; and

a guide portion extending from said second end of said at least one guide member wherein said guide portion defines an angularly disposed slot and groove; and

a tunnel forming device adapted to form a tunnel in the bone and further adapted to be received through said guide section and said slot.

25. The kit of claim 24, further comprising a flexible strand, wherein said flexible strand is selectively received in said groove.

26. The kit of claim 25, wherein the depth of said groove is substantially equivalent to an exterior dimension of said flexible strand.

27. The kit of claim 24, wherein said slot has a depth greater than a depth of said groove.

28. The kit of claim 24, wherein said at least one guide member comprises a plurality of guide members wherein each of said guide members have guide portions with different exterior dimensions, wherein said exterior dimensions are substantially equal the diameter of the tunnel.

29. The kit of claim 24, wherein said groove is adapted to hold said flexible strand over said tunnel forming device while said tunnel forming device is received through said slot.

30. The kit of claim 24, wherein said slot and said guide section are generally aligned.

31. The kit of claim 24, wherein said slot and said groove are disposed generally orthogonally.

32. The kit of claim 24, wherein said first leg and said second leg are generally perpendicular.

33. The kit of claim 24, further comprising a first implant to hold the soft tissue replacement in the tunnel.

34. The kit of claim 24, further comprising a second implant to affix the soft tissue replacement adjacent the bone.

35. The kit of claim 24, wherein said guide section is a bore, and wherein a terminal end of said second leg defines a second bore having a third axis comprising a detent, wherein said first axis and said third axis are generally orthogonal.

36. The kit of claim 35, wherein said first end of said at least one guide member comprises:

a projection adapted to be received in said detent; and

a collar including a shoulder adapted to engage said second leg such that said guide portion is a predetermined distance from said second leg.

37. A method of surgically attaching a soft tissue replacement to at least a bone member, comprising:

inserting an insertion rod comprising a guide portion into a first tunnel of the bone member, wherein a flexible strand is pre-loaded on said guide portion;

aligning a tunnel forming device through a guide section of a guide member with said guide portion;

forming a second tunnel transverse and through said first tunnel and said insertion rod with said tunnel forming device;

retaining said flexible strand within said first tunnel; and

removing said insertion rod from said first tunnel.

38. The method of claim 37, further comprising affixing said insertion rod to a guide system having an external guide portion such that said insertion rod is aligned with said external guide portion.

39. The method of claim 38, wherein the step of forming said second tunnel includes aligning a drill bit using said external guide portion.

40. The method of claim 37, further comprising the steps of:
forming said first tunnel in a first bone member; and
forming a third tunnel in a second bone member, wherein said first tunnel and said third tunnel are generally aligned when formed.

41. The method of claim 37, comprising the further steps of:
affixing a soft tissue replacement to a first end of said flexible strand; and
pulling said soft tissue over a member in said first tunnel and back out said first tunnel; and
affixing the soft tissue to the bone.

42. The method of claim 37, wherein said step of forming said transverse tunnel comprises aligning said tool bit to form said transverse tunnel using said insertion rod.

43. The method of claim 37, wherein the step of retaining said flexible strand in said first tunnel includes retaining said flexible strand with a tool bit.

44. The method of claim 37, comprising the further step of implanting a retaining member in said first tunnel, and wherein the step of retaining said flexible strand in said first tunnel includes retaining said flexible strand with said retaining member.

45. The method of claim 37, comprises the further steps of:
affixing said insertion rod to said guide member; and
fitting a keyed portion of said insertion rod into a keyed portion of said guide member, wherein said guide portion and said passage are aligned.

46. The method of claim 37, wherein said guide section comprises a passage in said guide member.